The Potential of Massive Open Online (MOOC)

and its Impact on Future Learning

A CRITICAL REVIEW OF LITERATURE

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DECLARATION

This declaration is to clarify that all of the submitted contents of this project paper are original in its figure, excluding those, have been admitted specifically in the references. All the work processes involved are from my own ideas and creativity.

All contents of this project paper have been submitted as part of partial fulfillment of master in ICT management, Asia e University.

I hereby declare that this project is my original work excluded for the references documents that have been acknowledged.

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Abstract

The Massive Open Online course is a central theme of discussion among academicians, it is however not a new phenomenon. The MOOC concept itself can be traced back to the lifelong learning movement which began in the early 1900's where various group of workers in the UK organised classes to educate themselves to further improve their lives. The movement continued during the industrial age and into the computer era whereupon lifelong learning became a preferred method to reskill oneself and gain more knowledge. In 2002 UNESCO outlined the concept of lifelong learning and referred it as an education targeted to adults outside the student's education systems.

The advent of globalisation and the rapid advancement in technology prompted today's society to seek and refine ever more new skills and levels of competency. Malaysia is just one among the many nations who sees lifelong learning as a key proponent to achieving and maintaining a constant pool of human capital.

MOOC utilises technology to encourage the use of virtual classrooms around the world as well as capitalising on the large number of eager students. MOOCs are either developed independently by academics or they may be developed via partnership between higher education institutions and third party online platforms. They enable students to access high quality academic content, and academics to engage with a much wider audience than before.

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List Of Abbreviations

AEU.........Asia E University

BOOC.......Big Open Online Course

DOCC.......Distributed Online Collaborative

ECTS........European credit Transfer and Accumulation System

ICT...........Information and Communication Technology

LMS.........Learning Management Systems

MIT..........Massachusetts Institute of Technology

MOOC.......Massive Online Learning

OER.........Open Educational Resources

OCW........Open Course Ware

SPOC........Small Private Online Course

SaaS.........Software As Service

xMOOC ....extended MOOC

CHAPTER 1

INTRODUCTION

The term MOOC (Massive Open Online Course) originated in 2008. It refers to an educational method via the Internet and is based on the philosophy of "Connectivism and Connective Knowledge" (Mehlenbacher, 2012). The name "Massive" denotes the number of participants which can reach up to 100 000 or more, and "Open" signifies the concept of encouraging participation. It also means that the curriculum is accessed through using mostly open-sourced tools. The MOOC aims to support unlimited numbers of participants via online tools, and according to Kop & Hill (2008) the MOOC term was pioneered by Stephen Downes and George Siemens after having conducted an online course using online teaching methodology inspired by the Connectivism philosophy. The experiment was on teaching classes conducted via the web was called CCK08 or Connectivism and Connective Knowledge in 2008 (Jacoby, 2014). According to Jacoby, the class represented a new way of teaching and required both student and educator to embrace new learning behaviours and redefine their definition of success.

MOOC is different from other online education models as it is usually supported by educational groups such as Massachusetts Institute of Technology (MIT) or Stanford University and are usually taught by professors (Mehlenbacher, 2012). Bersin (2013) added that MOOC was authored by top university professors offering specialised content through the leveraging of LMS technologies. The content is usually conducted free of charge or at a low cost using "distributed peer learning model". Entry barriers were also minimal as most of MOOC were generally designed

without any prerequisite or prior accreditation. Furthermore Carroll (2013) describes MOOC as a "cloud-based learning" as most of its services use "cloud technology". This meant that all lesson notes, comments and discussions are shared freely online. Therefore MOOC itself is more than just an ideology; it fosters a new approach to educational methods.

Online technology helps MOOC reach increasingly wider audiences compared to any other traditional methods. It engages learners from diverse backgrounds and from different parts of the world (Kitsiri, 2014). The development of MOOC started to reach traction at the beginning of 2011 with the increasing number of student participation from around the world Bersin (2012). In that year for example, an online course conducted by Sebastian Thrun called 'CS221: Introduction to Artificial Intelligence' had attracted 160,000 students worldwide with 20,000 students having successfully completed the course. The success of Thrum's initial course launched the MOOC movement and its subsequent popularity. Later, an increasing number of higher learning institutions that include professors started to jump onto the bandwagon and began their own online courses ("What You Need to Know About MOOCs," 2015).

In a talk that Thrun gave at the Google I/O 2015 Conference in San Francisco, he mentioned that his first no-cost course was offered via the web at a time when college fees became too expensive for a lot of people. Therefore Thrun's bold move opened up an alternative form of education that would become a leading form of education with participants numbering up to 160,000 (Thrun, 2015). The course has now been translated into 44 languages in 195 countries worldwide.

Thrun's doubt at the perceived equality of the current educational system of distribution lead him to set up a company called 'Udacity' with the mission to democratise education by offering courses at the lowest cost possible (Thrun, 2015). Within a year, two more MOOC startups appeared from across the world (Prueter, 2014). MOOC trying to solve several problems in online education such as developing compelling content which segmented in short video format along assessment and exercises. MOOC also provided a learning platform for content delivery and easy to use to find any course, join a course, bookmark the course and link the assessments, instructor feedback and participate in social interactions (Bersin, 2013).

Figure 1 – *Shows Several MOOC providers*

Source – http://www.onlineschools.org/visual-academy/mooc-money/

In an article written in "What You Need To Know About MOCC" published in 2015, several major players that offered MOOC was mentioned:

COURSERA - Coursera is an educational enterprise and is currently the largest MOOC platform in terms of university partners, number of courses, and student enrollment. It is a profit oriented company founded in 2012 by two computer-science professors from Stanford, Daphne Koller and Andrew Ng. The company's model is to sign contracts with colleges for the use of their platform to offer free courses. In return they would receive a percentage from the revenue. More than a dozen high-profile institutions, including Princeton and the University of Virginia have joined. As of May 2014, Coursera has over 100 partners offering over 600 courses online with students numbering over 5 million.

UDACITY - Udacity was established by Sebastian Thrun in 2011 following the initial offering of his "Artificial Intelligence" MOOC course at Stanford. It is a profit oriented enterprise that works with industry leaders and technology firms to develop technology and computer science-related courses to deliver contents sought by employers in the field. Udacity currently offers over 30 courses and partners with organisations such as Google, Facebook, and Cloudera.

edX - A nonprofit effort run jointly by MIT, Harvard, and Berkeley, edX plans to freely give away their software platform that powers free courses, so that anyone can use it to run MOOCs. Prior to this, MIT launched its own platform called MITx in 2011 before it was incorporated it into a not-for-profit venture with Harvard. The consortium now has more than 30 universities as its members that include University of Texas System, Wellesley College, Georgetown, Australian National University, and McGill University. To date over 150 courses are offered through edX and its partners.

KHAN ACADEMY - A nonprofit organisation founded by Salman Khan, a MIT and Harvard graduate. Khan Academy began in 2006 as an online library consisting of short instructional videos that Mr. Khan made for his cousins. The library—which has received financial backing from the Bill & Melinda Gates Foundation and Google, as well as from individuals—now hosts more than 3,000 videos on YouTube. Although its contents are not provided by universities, it does offer automated practice exercises. Recently Khan Academy added computer-science courses to its repertoire of online courses. Much of its content is geared toward secondary-education students.

UDEMY- A for-profit platform that lets anyone set up a course. The company encourages its instructors to charge a small fee, with the revenue being split between the instructors and the company. The authors themselves, with more than a few of them having no academic affiliation taught many of its courses.

Furthermore, learning platforms such as FutureLearn, Open2Study, and Iversity were derived from several MOOC platform spinoffs such as UK's Open University, Open Universities Australia and a German educational start-up, respectively. Currently the three learning platforms are at various stages of development and may someday become competitors to the primary American platforms (Prueter, 2014).

Late in 2012, the New York Times hailed the year as "The Year of the MOOC" (Jacoby, 2014). Since MOOC's rise in popularity many people from around the world are eager to take classes in mathematics, science, technology and humanity. As these classes were taught by renowned professors, students can have access to free courses from some of the world's most exclusive universities (Prueter, 2014).

2000-2007	2008	2009	2010	2011	2012	2013

Open education

Online distance learning

Open education resources

Connectivist MOOC (cMOOCs)

iTunes U, Khan Academy

Open source software

Udacity

Open content

Stanford xMOOCs

Coursera

Learning management systems

MIT - Open Courseware Consortium

MITx

edX

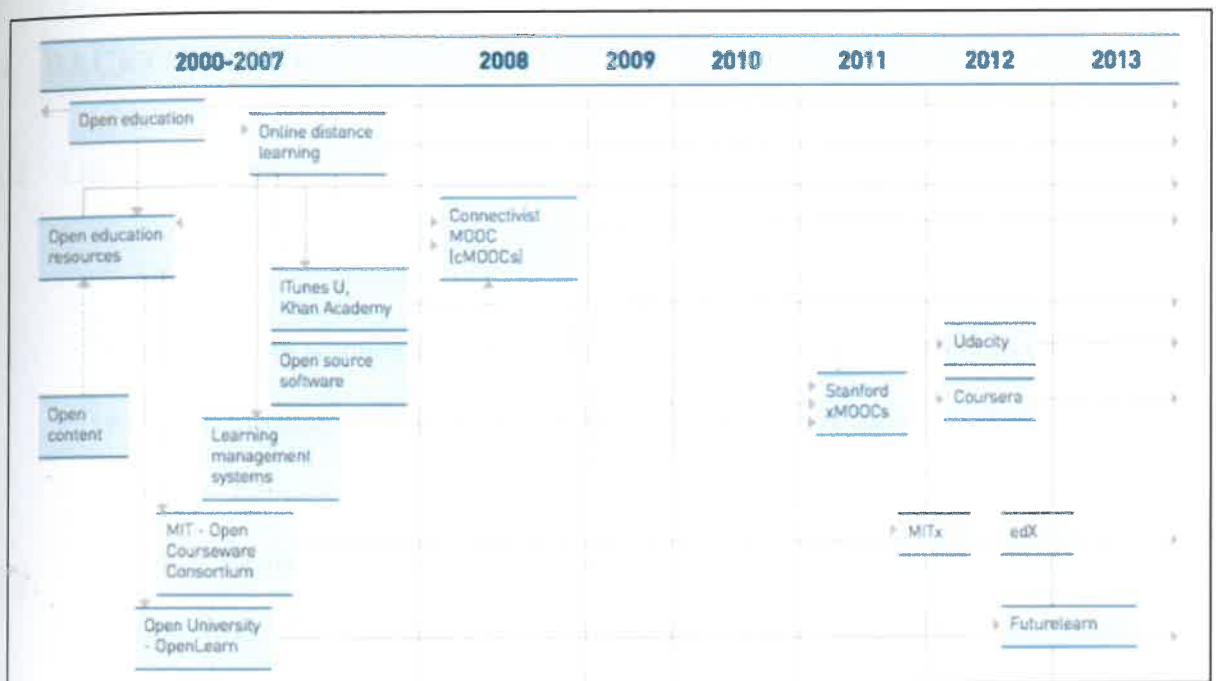Open University - OpenLearn

Futurelearn

Figure 2 – Shows timeline of establishment of online learning and MOOC providers

Source – Massive open online courses (MOOCs) by Brad Mehlenbacher

1.1 BACKGROUND

1.1.1 Life long Learning

According to Attwell (2007) long before MOOC appeared in the educational scene, life-long learning had first arisen from the Workers' Movement in the UK, when various groups such as the Mechanics Institutes, the Miners Halls, and the Workers' Educational Association organised classes and courses for workers to improve themselves through free access to education in early 1900s. Later in history when the Industrial Era was replaced by the Computer Age, education began to play an increasingly more central role as workers vie to continuously update their occupational skills education (Attwell, 2007).

Figure 3 – *Shows type of life long learning training*

Source – http://elearninginfographics.com/future-lifelong-learning-infographic/

The 2002 report by UNESCO Institute for Education outlines the concept of lifelong learning. This type of learning often refers to education targeted to adults to differentiate the needs of adult-learning activities from that of formal

institutional education intended for school-going children. This leads to the generalisation of life-long learning that is associated with learners who have reached adulthood and are no longer in the education system as students (Ghebllawi & Ahmad, n.d.).

The Organisation for Economic Co-operation and Development (OECD, 1996) describes learning as a continuous process; it started from day one and continues throughout one's journey in life. The Scottish Parliament in 2001 meanwhile referred lifelong learning as learning activities undertaken throughout life whether formal or informal (Ghebllawi & Ahmad, n.d.).

This concept of life-long learning still remains true until today where the market size for education as a whole that offers degrees and certificates in the traditional method as well as online are estimated to value around USD 1.2 trillion, while up-skilling programs sponsored by corporate entities estimate its value to around USD 130 billion annually (Bersin, 2013b). With such economy value and demands made by the industry. It is likely that education is fast becoming a profitable commodity for years to come.

Artwell (2007) states that our dependency on technology in business and social activities encourages the working class to continue learning in order to upgrade their occupational skills and gain new competencies. Ghebllawi added that globalisation and rapid technological advancement added more pressure in a society to realise the importance of life-long learning. He stresses that in Malaysia, access to life-learning has been instrumental in transforming government policies and implementation to ensure the availability of a growing

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pool of knowledgeable and skilled human capital. The Government is now promoting life-long education at the tertiary level as they believe that employability and productivity of their citizens would lead to a more prosperous nation. This led to the creation of policies such as the 1989 National Policy Education (NEP) which aims to produce holistic and competent individuals (Ghebllawi & Ahmad, n.d.).

According to Ivonova (2002) traditional learning environments such as schools and higher institutions are not adequate enough to furnish individuals to enter the current world environment. To keep up with today's pace individuals are obliged to continually upgrade their skills and knowledge through undergoing up-skilling classes. Thrun, the founder of Udacity and co-founder of Google X believed that education has to be life-long , it is because in the world we live today it is no longer practical for a person to have the same career for an entire lifetime. Thrun further added that a generation ago this may be true but in the current world it is widely accepted that an average lifespan of a career is 4.5 years. It is an indication that a college degree would not be sufficient anymore and employees must constantly re-learn new skills and adapt with the current economic situation to keep pace with their jobs. It was found that with Udacity especially, most adult learners consists of young to middle-aged professionals. This reveals that life-long education benefits the working class as well as those who have already completed their college education (Thrun, 2015).

However it is important to note that most adult learners cannot afford to undergo traditional learning in institutions and spend a significant amount of time away from their jobs and families. This is further compounded by the fact that

these traditional institutions do not offer suitable alternatives for adult learners to acquire knowledge while juggling their daily demands and responsibilities.

Furthermore the old method of traditional class room education where professors give one-way presentation is fast becoming irrelevant. Often the syllabus offered by colleges becomes obsolete after the students graduate. To overcome these tendencies Thrun is in the opinion that learning must be made fun and interactive, thus a viable way forward for the education system is through online technology (Thrun, 2015).

The existence of MOOC in the educational field allows these adult learners alternatives to re-skill themselves, however apart from the many benefits from such a form of learning, there are drawback. Despite all the hype, MOOC is still in the early stages of development and experimentation thus it is no surprise that MOOC providers are still lacking in accreditations compared to the more established traditional institutions. It is apparent that MOOC will not replace traditional education anytime soon. In the meantime as education is being increasingly made available to-go, MOOC is already benefiting a small group of people who are seeking continuing education to further improve their professional lives. More and more learners are drawn to its ease of access and opportunities for them to learn at their own pace (Thrun, 2015).

As the future of education is still inconclusive, companies and organisations are still seeking for new and improved formulas for delivering the perfect education system. Udacity for example in an effort to develop its credibility collaborated with corporate sectors such as Google Inc. in offering a variety of technology courses via their "NanoDegree programme". Having a corporate sector

validate its courses substantiates for its lack of accreditation. To date Udacity courses have attracted 874, 000 students worldwide and generated over 374.4 million of video views and 133.5 million quiz submissions (Thrun, 2015).

Even though students wishing to enroll in the Udacity's course of study are charged USD 200 per month (Thrun, 2015) the programme saw a 5 percent increase in intake every week which shows a high demand from learners. This programme borrows from operational models from Uber and Airbnb where the instructors are gathered from all over the world to provide markings and assistance to the global students. This model enables students to receive feedback within an hour. Furthermore the fees collected to the students will help Udacity pay for the instructors (Thrun, 2015).

The education style offered by Udacity's Nano Degree Certification appears to be a good fit for adult learners as it allows self-directed study and focuses on specific skills needed in the industry. Nano Degree emphasizes technology because of the increasing opportunities offered in the career field (Thrun, 2015).

1.1.2 Distance Learning and Online Education

According to Ela & Özbek (2015), as the world population grows the demand for education also increases. However it appears that the traditional custom of face-to-face education is unable to cope with the pressure. Increasingly distance learning has become a logical choice for learners; particularly at a time when online web-based learning which mostly operated via the Internet have become a viable alternative towards gaining an education.

As cited by Casey (2008) distance learning started out as a means to affordable education using the postal service to deliver study materials to students. As communication technologies advanced, delivery methods evolved to include radio, television, video recorders, home computing and the Internet (Liyanagunawardena, Adams & Williams, 2013). Online learning or web-based learning (WBL) consist of activities conducted in virtual classroom to deliver education , as cited by (Rosenberg, 2001). Its refer to internet technologies used to deliver education solutions (Poon, Low, & Yong, 2004).

According to Poon et al. (2004) Malaysian distance learning begins in the early 1980s with external degree programmes offered by University of London followed by an off-campus programme offered by Universiti Sains Malaysia. Distance learning at the time uses print-based material and face to face tutorials. The explosion of tertiary education in Malaysia demanded that online methods were used to deliver lessons to remain competitive. As part of a university's unique offering, several universities such as Open University and AeU also offer programmes for working adults and are dependent upon online technologies as their instructional method of delivery.

International online training content provider such as Lynda and PluralSight company have sharpen their strategies in providing state-of-the-art propriety online learning system for their niche training market (Bersin, 2013). PluralSight for example acquired Digital Tutors, a company focused on online training for creative professionals to add another 1500 courses to its online library in 2014. This shows that the company intends to maintain their dominance in the market for offering software training content (Shieber, 2015). This is followed by the acquisition of Lynda by LinkedIn in April 2015. Lynda is a leading online

learning company that teaches business, creative skills and technology. With this acquisition LinkedIn not only enables its members to find a job or build a business but also assists their individual members to upgrade their skills according to the needs of the industry. LinkedIn has also announced their intention to create the world's first "Digital Economy Graph" that would include profiles for every one of its 3 billion members in the global workforce in addition to profiles for every company in the world. This step taken by LinkedIn would help connect talents with opportunities available through the digital age (Roslansky, 2015). The data offered on this programme would definitely impact the way people attain education and consequently enter the future workforce.

Shieber (2015) observed that spending on professional training for software and information technology could reach up to $107 billion by the end of 2015 (Global Industry Analysts project, 2015). This proves that online education has the potential to become a lucrative investment. Moreover it is fast becoming a viable solution to improving talents and skills in the competitive global economy of today.

The flexible learning model offered by these online courses where learners can learn at their own pace and revisit the course material at any given moments further boosts its popularity. However contrary to traditional forms of education, e- learners have their own particular challenges to overcome in order to make their online experience a success. The self-discipline to regulate activities such as regularly checking on websites, keeping abreast of forum discussions and any important announcements made by course instructors are important attribute for learners to develop; without those capabilities it is easy for learners to procrastinate and eventually drop out of such programmes (Ela & Özbek , 2015).
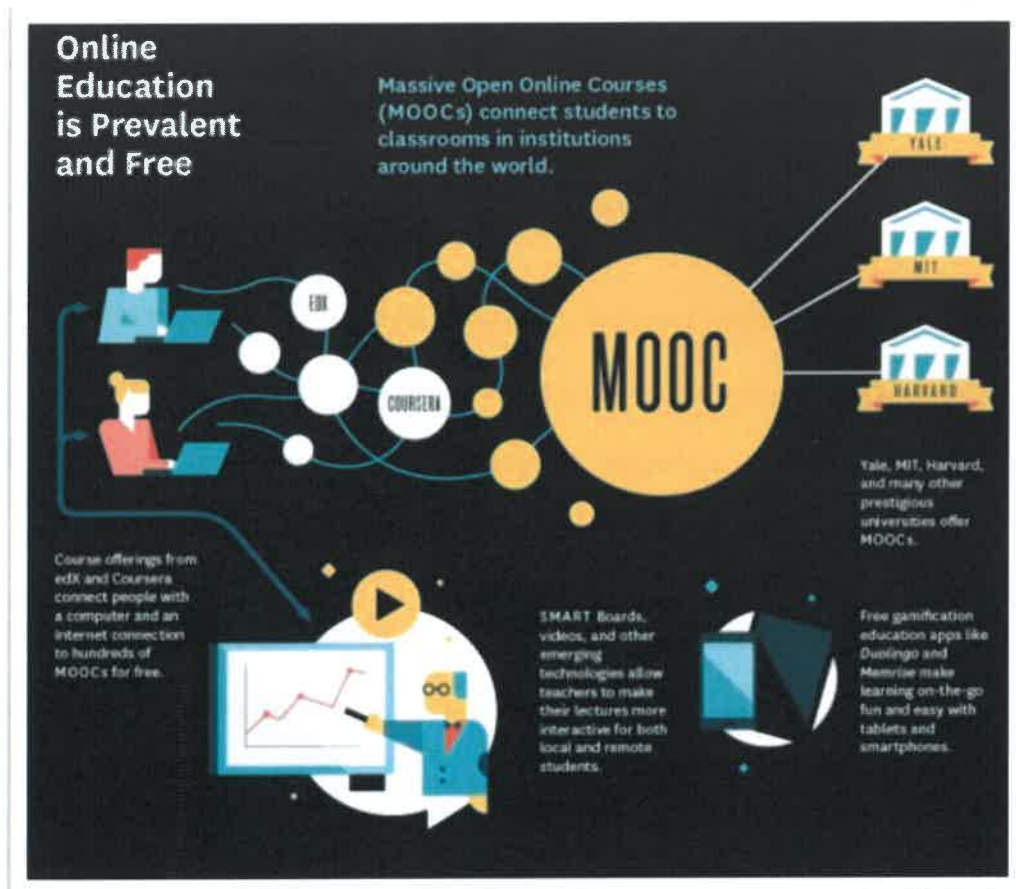
Figure 4 – *Shows online education becoming a alternative solutions for education*

Source – http://www.huffingtonpost.com/2014/07/25/education-of-the-future_n_5549193.html

1.1.3   Open Educational Resources (OER)

In early 2000, the term web 2.0 was coined to refer to complex websites used for social networking, virtual learning communities, cognitive tutors, and LMS (learning management systems) thus fostering the birth of social learning. C. Bossu et al. (2011) noted that (as cited in de Freitas and Oliver, 2005) universities started to view the Internet as another way to offer and facilitate education via virtual world interaction and mobile learning, among others. As education became more accessible, open learning grew into much more than the activity of sharing of educational ideas, materials, and knowledge (Rhoads, Berdan, & Toven-

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lindsey, 2013). Its influence on education is extensive, for example it helps to build bonds between students and teachers via social relationships which occur from knowledge transferring activities. This made a great impact on thinking and pedagogical practice in the educational system (Dinevski, 2008).

Since its earlier days, life-long learning is still very relevant and continues to develop alongside emerging learning technologies. Life-long learning answers a society's needs; it is seen as above and beyond any political agenda and is viewed as a solution towards the challenges that globalisation brings (Dinevski, 2008).

Open Educational Resources (OERs) is a concept adopted by some educational institutions which acknowledges that learning materials should be free for use by the community without charge and users are given rights to repurpose and redistribute the contents. Wiley (2009a) explained that the movement originated from the open source community that values the culture of sharing, collaboration and open knowledge (Tuomi, 2013). Sharing and collaborative efforts of OERs are believed to be able to transform education from the limited one-way information delivery to the process of learning itself (Bossu & Tynan, 2011). As further discussed by Bossu, OERs would be a most suitable method to close the gaps still existing in formal and informal learning by adapting to learner's requirements.

OER has initiated transformation in education worldwide by utilising the concept of online social interaction. The movement is viewed as a natural way to implement distance learning, through an open education and a new pedagogical approach (OECD, 2007; Thomas & Brown, 2011; Okada, Connolly, & Scott, 2012; Ehlers, 2011). The Paris OER Declaration (UNESCO, 2012) at the

UNESCO World OER Congress in June 2012 which requests member states to foster and facilitate the use and development of OERs serves as an indication that OERs is an important phenomenon for any future learning and education to take place.

Since OERs contents were intended to become a definite part of a larger educational experience within a specific educational framework, the contents of OER were limited in used. This led to frustration among aspiring learners (Liyanagunawardena, Adams & Williams, 2013).

Between 2007 and 2008 academicians from Stanford and MIT experimented with methods to extend their reach through uploading their fee lectures on YouTube. The move generated much press however the university started to worry over potential damage brand and price disruption. Other challenges faced by universities in the continuation towards this effort were objections from fellow academicians who refuse to participate and the need to have a robust online infrastructure to ensure content quality (Bersin, 2013).

In time MOOC's response is to improve OER by redefining its concept of open access to wider audiences and redesigning a more comprehensive delivery of education to the people (Tuomi, 2013).

According to Rhoads et al. (2013) web 2.0 technologies also helped to launch a movement that is a subcomponent to the broader open educational resources (OER) called the OpenCourseWare (OCW). It is an effort to digitalise learning materials for the wider web community. Both OCW and OER aim to designate knowledge and information as a commonwealth without incurring any costs. They